Lecture 1: Financial Statement Analysis

Investors use financial statement analysis to assess growth, profitability, efficiency, and the risk of financial distress through comparison over time and with industry competitors. Ratios are also a useful way of expressing relationships between financial accounts, however, not all ratios are useful. Only *relative* financial ratios are relevant in the analysis process (ratios that can compare the company's performance to that of the industry, past years, competitors etc.).

Note: Ratios tell you what happened but not necessarily why it happened; this comes with further analysis of the business environment and related accounts. It is important to take your time to thoroughly understand what each ratio is calculating.

Area	Ratio	Formula	Unit	Meaning	Notes
Efficiency How efficient are the company's assets?	Inventory Turnover	$\frac{COGS}{Av.\,Inventory}$	Times per Year	How frequently inventory is bought and sold throughout the year	High: the inventory is quickly bought then sold; either the company has effective inventory management or inadequate inventory supply (depends on revenue growth)
	Days of Inventory on Hand (DOH)	$\frac{365}{Inventory\ Turnover}$	Days	Average days inventory is held by the company	High/Low interpretation is opposite to inventory turnover i.e. if ITO = 50 (high), DOH = 7.3 (low) but both mean inventory is being sold quickly
	Receivable Turnover	$\frac{Revenue}{Av.\,A/cs\ Receivables}$	Times per Year	Frequency of cash collection from customers.	High TO: cash is being collected frequently which is beneficial to the company
	Days of Sales Outstanding (DSO)	$\frac{365}{Receivables\ Turnover}$	Days	Time between a sale and cash collection	High/Low opposite to RTO
	Payables Turnover	$\frac{Purchases\ or\ COGS}{Av.\ A/cs\ Payables}$	Times per Year	How many times per year the company pays off all its creditors	Most credit contracts are for 30 – 90 days so if 4 < PTO < 12 creditors will be happy

	Days of Payables (DOP)	$\frac{365}{Payables\ Turnover}$	Days	Days it takes to pay suppliers	Depends on credit terms, usually 30 to 90 days is efficient
	Working Capital Turnover	$\frac{Revenue}{Av.Working\ Capital}$	Times per Year	How efficiently revenue is generated from working capital	High: greater efficiency Working Capital = Current Assets – Current Liabilities = Cash + Receivables + Inventory – Payables
	Asset Turnover (ATO)	$\frac{Revenue}{Av.Total\ Assets}$	Times per Year	Efficiency of assets to generate sales	Depends on type of business strategy: cost effective would want a higher turnover compared to profit margin (vice versa for differentiation strategy)
Note: All turnover ratios have the account's average on the denominator (bottom of fraction) and the corresponding income/expense account on the numerator (top) i.e. Receivables TO = Revenue / Av. Receivables; Payables TO = Purchases / Av. Payable etc.					
Liquidity Is there any short-term distress?	Current Ratio	$\frac{Current\ Assets}{Current\ Liabilities}$	-	Measures liquidity of company i.e. whether current assets can cover current liabilities	If ratio is < 1, CL > CA meaning the company may have liquidity problems i.e. greater reliance on operating cash flow/outside financing to meet short-term obligations
	Quick Ratio	$\frac{\text{Cash} + \text{Marketable Securities} + \text{Receivables}}{\text{Current Liabilities}}$	-	As above	Same as Current Ratio but uses more liquid assets; Inventory is excluded as it takes a while to generate cash from A/cs Rec.

Lecture 5: Bond Basics

Bond Characteristics

A bond is a debt security similar to a loan that is issued in the financial markets. The borrower issues/sells the bond (receiving money) to the lender and then makes specified payments (coupons) to the bond holder on specified dates (repayments). The coupon rate, maturity and par value are all determined in the bond indenture (agreement). For coupon-paying bonds, the issuer pays coupons (determined by interest on the face value) semi-annually and then pays the par value (face value) when the bond matures.

Bonds are usually issued with coupon rates set just high enough to induce investors to buy the bond. Zero-Coupon paying bonds are usually issued at a discount price (below the par value) to entice investors to buy the bond (as they will not receive coupons). The lender's return is the difference between the issue price and par value. Bonds can be traded amongst investors just like shares and the market is divided by maturity:

- Money Market – ST issues maturing within 1 year
- Notes – intermediate issues maturing from 1 – 10 years, and
- Bonds – LT issues maturing greater than 10 years

Pricing Bonds

To value a bond you must discount its expected cash flows, which are the coupon payments until maturity and the final payment of the par value (face value).

$$Bond\ Value = \sum_{t=1}^{n} \frac{Coupon_t}{(1+r)^t} + \frac{Par\ Value}{(1+r)^n} = \frac{Coupon * [1-(1+r)^{-n}]}{r} + \frac{Par\ Value}{(1+r)^n}$$

Where n is the number of periods until maturity
Note: the value of a zero-coupon bond would simply be the present value of the par.

Example: Pricing Bonds

You hold a 10 year bond with a par value of $1000. You receive coupons semi-annually at a rate of 8% while the yield is 10%. Based on this information alone, is the bond priced above, below or at par? Prove this by calculating the value of the bond.

Because the coupon rate is 8% < yield of 10%, the bond would be priced at a discount (below par). To calculate the value of the bond, all rates and time-periods must be in semi-annual form (because the coupons are paid semi-annually). Therefore, t = 10 * 2 = 20 (2 periods per year * 10 years) and yield = 10% /2 (semi-annual yield).

Coupons are compounded semi-annually:

$$Coupon = \frac{0.08 * 1{,}000}{2} = \$40$$

$$Value = \frac{40 * (1 - 1.05^{-20})}{0.05} + \frac{1{,}000}{1.05^{20}} = \$875.38$$

Price-Yield Relationship

The price-yield relationship is convex, meaning it is not a linear relationship but a negative slope that curves upwards (price on y, yield on x). The yield to maturity (required return) is the return which bond investors will earn if there are no defaults, the investor can reinvest the coupon payments at the same YTM and the investor holds until maturity or sells when the interest rate is the same as the beginning of the bond agreement. Consider the yield to maturity as the rate you need to break even and the coupon rate as the rate you receive.

If YTM < Coupon: bond is price above the par value (premium)
If YTM > Coupon: bond is price below the par value (discount)

Bond Yields

The YTM is also the interest rate that makes the PV of bond payments equal to its price (the IRR).

$$Current\ Yield = \frac{Coupon}{Bond\ Price}$$

For Premium Bonds: YTM < Current Yield < Coupon Rate
For Discount Bonds: YTM > Current Yield > Coupon Rate

$$YTM = \frac{(Income\ per\ year + Capital\ Gain\ per\ Year)}{Average\ Investment} = \frac{\left(Coupon + \frac{(Par - Price)}{Term\ to\ Maturity}\right)}{\frac{(Par + Price)}{2}}$$

Example: Yield to Maturity

You hold a 10yr $1,000 11% annual coupon bond that sells for $1,061.45. What is its yield to maturity?

The par, price and term to maturity are given in the question, the only other thing that needs to be calculated is the coupon payment. Coupons are compounded annually:

$$Coupon = \ 0.11 * 1{,}000 = \$110$$

$$Value = \frac{\left(Coupon + \frac{(Par - Price)}{Term\ to\ Maturity}\right)}{\frac{(Par + Price)}{2}} = \frac{\left(110 + \frac{(1{,}000 - 1{,}061.45)}{10}\right)}{\left(\frac{(1{,}000 + 1{,}061.45)}{2}\right)} = 0.1008 \approx 10\%$$

Yield to Call

A callable bond may be retired before maturity. The call provision allows the issuer to repurchase the bond at the call price. Non-callable bonds are those that convex on a **price/interest rate graph**, whereas callable bonds are straight at the call price over a range of low IRs (due to increased risk of call) then converge with non-callable bonds (where they have the same value).

At high interest rates, the risk of call is low as the value of the bond is less than the call price (where it converges with the value of non-callable bonds). For lower rates, the values diverge and the difference reflects the value of the option to reclaim the bond at the call price. Therefore, if the

value of the bond is greater than the call price (due to a decrease in interest rates), the issuer is likely to call the bond. Its value at this point is the call price. The price of a callable bond is calculated using the normal formula but the par value if received at the exercise date rather than at maturity.

Note: This suggests that analysts may be more interested in a bond's yield to call rather than yield to maturity, especially if the bond is likely to be called.